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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/858,397	05/16/2001	Frank Randolph Bryant	92-C-074D3 (STMI01-00024)	4170

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EXAMINER	
DUONG, KHANH B	

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/858,397	BRYANT, FRANK RANDOLPH	
	Examiner	Art Unit	
	Khanh B. Duong	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *17-23,25,46-49 and 51-59* is/are pending in the application.

4a) Of the above claim(s) *17-23,25,58 and 59* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *46-49 and 51-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 11, 2006 has been entered.

Response to Amendment

Accordingly, claims 17, 20, 21, 25 and 46 were amended.

Claims 17-23, 25, 58 and 59 remain withdrawn from consideration as being directed to a non-elected invention.

Currently, claims 46-49 and 51-57 remain active.

Response to Arguments

Applicant's arguments with respect to the amended claims have been considered but are moot in view of the new ground(s) of rejection.

In response to Applicant's remarks regarding the amended claims "providing no basis for differentiating the process of making and the product made due to alleged patentable novelty between deposition of oxide and thermal growth of oxide". In response, the Examiner respectfully disagrees because the claims of Group II recite product-by-process limitations which have not been given patentable weight because product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. "[E]ven though product-by-process claims are limited by and defined by the process, determination of

patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Therefore, as previously stated, the inventions Group I and II are further distinct for the following reason: instead of reoxidizing the polysilicon layer to form an oxide layer, use chemical vapor deposition (CVD) to deposit an oxide layer over the polysilicon layer. Furthermore, it is noted that the device of Claim 46 does not recite an oxide layer over the gate structure which is required in the methods of Claims 17 and 25.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 46, 48, 49, 51, 52, 54 and 55 are rejected under 35 U.S.C. 102(b) as being anticipated by "Fabrication Technique for Fully Recessed Oxide Isolation", IBM Technical Disclosure Bulletin, March 1, 1977, Volume No. 19, Issue No. 10, page 3947-3950.

Re claims 46, 48, 49 and 54, the IBM Technical Disclosure Bulletin above (herein "IBM TDB") expressly discloses in FIGs. 2A-2C an integrated circuit device comprising: a substrate (P-Si); a gate structure, wherein the gate structure includes: a gate oxide layer ("OXIDE") on the substrate; a nitride layer ("NITRIDE") over the gate oxide layer; and a polysilicon layer

("POLYSILICON") over the nitride layer; a channel region inherently under the gate structure; and source/drain regions (boron ions implanted regions) in the substrate adjacent the channel region; wherein the gate structure has a peripheral edge and further including an uplift (bird's beak) in portions of the nitride layer proximate the peripheral edge of the gate structure, wherein asperities are absent from the polysilicon layer.

Re claims 51 and 52, the IBM TDB expressly discloses in FIG. 2C: the substrate has a surface and further including an indentation in the surface of the substrate located proximate to the peripheral edge of the gate structure; the gate structure includes sidewall spacers (NITRIDE) located on each edge of the gate structure and lightly doped drain regions (boron ions implanted regions) in the substrate below the sidewalls spacers.

Re further claims 46, 49, 51, 54 and 55, the claims recite the following product-by-process limitations: the uplift caused by reoxidation of of the polysilicon layer within the gate structure; the nitride layer is formed by nitrogen implantation to form an implanted area and by annealing of the implanted area; the uplift caused by reoxidation of the gate structure, wherein asperities are absent from the polysilicon layer; the indentation resulting from reoxidation of the gate structure; and the source/drain regions are implanted prior to or after reoxidation. However, these limitations have not been given patentable weight because product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the

prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 46-49, 52, 53 and 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al. (U.S. 4,192,059) in view of the IBM TDB.

Re claims 46, 48, 49, 52, 53 and 55 Khan et al. ("Khan") discloses in FIG. 12 an integrated circuit device comprising: a substrate 3 (p-type); a gate structure, wherein the gate structure includes: a gate oxide layer 4 on the substrate 3; a nitride layer 5 over the gate oxide layer 4; and a polysilicon layer 15 over the nitride layer 5; a channel region under the gate structure; source/drain regions (n-type) in the substrate 3 adjacent the channel region; and

sidewall spacers 34 located on each edge of the gate structure and lightly doped drain regions in the substrate below the sidewalls spacers 34.

Re further claim 46, Khan fails to disclose the gate structure further including an uplift in portions of the nitride layer proximate the peripheral edge of the gate structure, wherein asperities are absent from the polysilicon layer.

The IBM TDB expressly shows in FIG. 2C the gate structure further including an uplift (bird's peak) in portions of the nitride layer ("NITRIDE") proximate the peripheral edge of the gate structure, wherein asperities are absent from (at least the top and side surfaces of) the polysilicon layer.

Since Khan and the IBM TDB are from the same field of endeavor, the purpose disclosed by the IBM TDB would have been recognized in the pertinent prior art of Khan

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device disclosed by Khan as taught by the IBM TDB because of the desirability to suppress oxidation at the end of the polysilicon gate.

Re further claims 46, 49, 53 and 55, the claims recite the following process limitations: the uplift caused by reoxidation of the polysilicon layer within the gate structure; the nitride layer is formed by nitrogen implantation to form an implanted area and by annealing of the implanted area; the source/drain regions are formed by implanting n-type impurities in the p-type substrate; and the source/drain regions are implanted after reoxidation. However, the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, these limitations have not been given patentable weight.

Re further claims 47, 56 and 57, Khan fails to show specific dimensional parameters of the nitride layer, gate oxide layer and channel region.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Khan by selecting such dimensional parameters within the ranges as required by the claims, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on Monday - Friday (9:00 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith, can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KBD

Zandra V. Smith
Supervisory Patent Examiner
24 June 2006